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Book of Abstracts
November 2-5, 1998

Kellie Ann Beall, Editor

Building and Fire Research Laboratory
Gaithersburg, Maryland 20899

United States Department of Commerce
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U.S. Department of Commerce
William M. Daley, *Secretary*
Technology Administration
Gary Bachula, *Acting Under Secretary for Technology*
National Institute of Standards and Technology
Raymond G. Kammer, *Director*

FEWER UNWANTED ALARMS:
Technology and education are helping to reduce the occurrence of unwanted fire alarms.

Fred Conforti

Pittway Systems Technology Group
4225 Naperville Road, Suite 155
Lisle, IL 60532
Tel 630-577-3700
Fax 630-577-0808
fred_conforti@pittway.com

ABSTRACT

Although our real world perception indicates that we are getting more unwanted alarms, research and data supporting this perception have been non-existent. Our belief was that this perception was wrong.

In search for real data, Pittway Systems Technology Group joined with the Naperville, Illinois Fire Department and Buddingh & Associates (an independent research firm) to study the history, causes and frequency of unwanted alarms across all types and ages of fire protection equipment installed in commercial environments. The hypothesis that the study was designed to test was: Commercial buildings with the latest technologies in fire detection will experience fewer unwanted alarms than buildings using older technologies.

To test the hypothesis, Naperville, a suburb of Chicago, was chosen because it was a growing community with a variety of commercial establishments whose fire department logged pertinent data continuously. The Naperville Fire Department had extensive information on false alarms since 1985 and specific information on commercial type systems installed since 1990. The original goal of the study was to identify 200 reporting sites having unwanted alarms. The eventual research yielded a database of 821 sites of 3,510 systems installed.

Unwanted alarms consist of false alarms and nuisance alarms. Too often, the two terms are used interchangeably. False alarms are a result of non-smoke stimuli, including system malfunction, electrical problems and lightning strikes. Nuisance alarms are those caused by non-threatening smoke or smoke-like stimuli, including kitchen and bathroom steam, cigarette smoke, burnt toast, etc. In the Naperville study, false and nuisance incidents were logged separately and were analyzed across the commercial base.

The study clearly showed that the original hypothesis was valid: newer systems experience fewer false alarms. The ratio of false alarms per system in 1985 was 1.15 per system per year on a base of 578 installed systems. In 1997, the ratio was 0.56 per system per year on an installed base of 3,510 systems. This is a 2-to-1 reduction in false alarms per system per year during a period when the number of installed systems grew sevenfold. The reduction in false alarms took place steadily as newer, improved systems were installed.

While the study showed the rate of false alarms has clearly declined, it also showed that the rate of nuisance alarms per system has remained relatively constant, indicating areas for future improvements in technology, testing, and education.

The data also showed that new installations are the worst offenders in generating unwanted alarms. This phenomena is well known to installers and fire professionals who have come to expect a "shakedown period" during which a new system is tested with real occupants, their usage patterns, and the environment. New system problems are typically nuisance alarms due to poor location. The study indicated that in 1996, new systems (those installed within the previous twelve months) were responsible for 30% of all unwanted alarms. In checking to determine if this was an isolated or unusual year for unwanted alarms, it was compared to 1988, where data indicated that 32% of the unwanted alarms were from installations less than twelve months old. Not much difference. This data provides us with areas to concentrate on to further reduce unwanted alarm phenomena, and a benchmark by which to measure our progress.

Since 1986, manufacturers have focused on improving detection technologies and alarm systems with significant advances in bug screens, humidity and dust immunity, development of alarm verification, the introduction of intelligent systems and multi-sensing, multi-criteria detectors to name some. All of these have combined to help reduce the rate of false alarms.

While the Naperville study clearly supports the fact that false alarms are coming down and the notion that the newer systems, once "settled in", are responsible for fewer false alarms than older systems, the study does not differentiate the impact that improved test standards versus improved designs have played in helping to improve system reliability and reducing nuisance alarms. Many significant refinements to agency test programs have been made over the years to verify a product's probable satisfactory performance in the real world.

Organizations like the National Fire Protection Association (NFPA) and the Automatic Fire Alarm Association (AFAA) have worked tirelessly to help increase the fire industry's access to training and resources. The U.S. Department of Commerce, through its National Institute of Standards and Testing, has added considerably to the body of knowledge concerning fire phenomena. Manufacturers, engineers, distributors, and installers continue to offer, develop, and seek out educational opportunities, like NICET certification, to improve the performance and delivery of fire protection products and services.

Together, technology, testing and education work hand-in-hand to improve fire protection reliability. While we will never be able to completely eliminate the human factor by design, construction and usage, it is obvious that the tools and tests necessary to continue to reduce unwanted alarms are within our reach. The Naperville study provides us with our first measurable indicator that we are making progress. It also gives us a benchmark to monitor our progress and reminds us that this is a complex issue requiring active involvement of the entire fire community.

REFERENCES

1. Dubivsky, P. M. & Bukowski, R. W., False Alarm Study of Smoke Detectors in Department of Veterans Affairs Medical Centers (VAMCS). Technical Report 4077, National Institute of Standards and Technology, Gaithersburg, MD, 1989.
2. Donohue, P. A., False alarms from automatic fire detection systems. Fire Research Station Information Paper 13/92. Borehamwood, BRE, 1992.